

### **Remarks**

Claims 22–24, 26–32, and 34–46 are pending in this application. Applicant is amending claims 22, 30, 40 and 43. Claim 47 has been added. Applicant has cancelled claim 28.

Claim 28 was objected to because it depends from cancelled claim 25. Applicant has cancelled claim 28 rendering the rejection moot.

### **Rejections Under 35 U.S.C. 103**

#### **Section (1)**

Claims 22-24, 26-32, 34, 35, 38, 40, 43, 45, 46 were rejected under 35 U.S.C. 103(a) as being unpatentable over Paas (US 5431706) in view of Rummller et al. (U.S. 5853579) and Dillman (US 5873918). Applicant traverses the rejection on the basis that a person of ordinary skill would not have been motivated to combine and modify references as suggested by the Examiner at least for the following reasons.

Paas '706 teaches a disposable particulate filter. See title of the invention. Paas identifies several advantages associated with the disposable particulate. The advantage of the entire filter 12 being made from a filter media itself without the need for integral metal support elements such as end retainers or filter media supports screens thereby reducing production costs and material costs and allows the filter 12 to be incinerated or disposed in land fills without any special difficulties. See Column 4, lines 37-44. The Examiner proposes to rearrange the construction of Paas based upon the structure disclosed in Dillman and further to substitute the catalyst ceramic foam filter of Rummller in place for the disposable filter 12 of Paas. The proposed modification is improper because the intended function of Paas' disposable filter would be destroyed by the inclusion of a ceramic filter including a catalyst thereon which neither Dillman nor Rummller teach as being removable and would not be subject to incineration or disposal in a landfill as taught as the advantage and purpose of the disposable filter 12 of Paas. Further, both Dillman and Rummller teach different methods for addressing particulate trap filters. Dillman teaches that the particulate should be combusted using resistive heating elements

including a current supply 16, a foot 3 connected to ground 23 through a metal fiber matt 10. Rummler is directed to a treatment system for liquid and solid waste wherein the liquids and solids are separated from each other and the solids are burned off using microwaves. See the Abstract and Column 14, line 63 – Column 15, line 10. The ceramic foam filter including a catalyst is used to scrub exhaust produced by the irradiation of particulate matter trapped in the filter after separation of liquid from the solids. As such, Paas teaches a passive method of trapping particulate matter in an exhaust stream and disposing of a filter including the particulate matter. Dillman teaches a method of regenerating a metal fiber mat by combusting trapped particulates using resistive electric heating and Rummler teaches a completely different system which does not involve the flow of exhaust gas through the filter but the separation of liquid and solid materials from waste wherein the solids are irradiated by microwave energy. Therefore, a person skilled in the art wouldn't have been motivated to make the proposed modifications suggested by the Examiner in view of the teachings as a whole of the reference relied on.

Furthermore, Applicant has amended the independent claims to make it clear that the catalyzed foam filter of Applicant's claimed invention is constructed and arranged to convert NO in engine combustion exhaust flowing through the product or filter to NO<sub>2</sub> so that additional NO<sub>2</sub> is in the exhaust stream in an amount sufficient to oxidize carbon particulates trapped by the foam filter. There is no teaching in Rummler et al. of the use of a catalyzed foam filter constructed and arranged for such a purpose. The Examiner's attention is respectfully directed to the instant application in paragraph 0002, page 1, lines 7-25 which discloses that in prior art filter combinations the exhaust gas from an engine may include a variety of constituents including NO and particulate matter which typically is in the form of carbon-based material. The catalyst on the flow-through monolith 22 shown in Figure 1 promotes the reaction of NO with oxygen also present in exhaust gas to form NO<sub>2</sub>. However, the reaction is not sufficient enough to completely convert all of the NO in the exhaust stream to NO<sub>2</sub>. The NO<sub>2</sub> in the exhaust gas can be utilized to oxidize the carbon in the particulate matter to form NO and CO, thus removing some of the particulate blocking the wall-flow monolith. However, the amount of NO<sub>2</sub> present in the exhaust gas from the engine or generated in the wall-flow monolith 22 is not sufficient to

completely oxidize the particulate matter blocking the wall-flow filter monolith. Applicant's claimed invention solves this problem and utilizes a ceramic foam filter including a catalyst to produce additional NO<sub>2</sub> to oxidize the carbon particulate matter. Requiring the exhaust to flow through the catalyzed foam filter first results in additional NO<sub>2</sub> (Nitric Oxide) being produced in the exhaust gas so that particulate matter may be oxidized to CO.

Each of the independent claims 22, 30, 40 and 43 have been amended to call for such a catalyst as part of the foam filter.

Rummller teaches using a catalyst such as cobalt and nickel for scrubbing exhaust produced from irradiation of solid material using microwave energy. The catalyst foam filter in Rummller is positioned downstream of what the Examiner is considering as the wall flow filter.

### Section (2)

Claims 22-24, 26-29, 35, 40, 41, and 45 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rummller et al. (US 5853579) in view of Dillman (US 5873918). Again, Rummller teaches a system for separating liquid and solid waste and does not suggest a filter constructed "so that exhaust flows through the catalyzed foam filter and then flows through the wall-flow filter" as recited in independent claims 23, 30, 40 and 43 ("exhaust gas first flows through the catalyzed foam filter and then flows through the wall-flow filter"). Rummller teaches a system for the separation of liquid and solid waste wherein after the liquid has been separated from the solid waste, the solid material is irradiated and the resultant gas flows in all directions through the filter. Therefore Rummller does not disclose or suggest "exhaust gas first flows through the catalyzed foam filter and then flows through the wall-flow filter". Even if there was some motivation to modify Rummller with the disclosure taught in Dillman, such would not arrive at applicant's claimed invention. No prima facie case of obviousness has been established. Withdrawal of the rejection is respectfully requested.

### Section (3)

Claims 30-32, 34, 38, 43 and 46 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rummller et al. (US 5853579) in view of Dillman (US5873918) and either one of Miller et al. (3319793), Nagaoka (6488842) or Paas (US 5431706).

Again, Rummller teaches a system for the separation of liquid and solid waste wherein after the liquids are removed from the filter the solid material is irradiated using microwave energy. A person skilled in the art wouldn't be motivated to modify Rummller with the structure from Dillman which teaches an apparatus for filtering diesel engine exhaust. These are two different separation systems and a person skilled in the art wouldn't look to Dillman to modify Rummller. Again, Rummller also teaches positioning the catalyst foam filter downstream of what the Examiner considers is the wall flow filter. The proposed modification would then require the catalyst of Rummller to be moved to an upstream position with respect to flow of material through the filter. Simply because the prior art could be modified, doesn't make the modification obvious unless there is a purpose or advantage associated with making the modification. See *In Re Laskowski*, 871 F. 2d 115 (Fed. Cir. 1989). Furthermore, the rationale offered by the Examiner for the modification is in error. The Examiner maintains that it would have been obvious at the time of Applicant's invention to provide a first space, wall flow filter, and second circumferentially surrounding a side edge of the catalyzed foam filter of Rummller in order to provide a known configuration for diesel exhaust treatment apparatus. However, Rummller's system is for the separation of liquid and solid waste materials not for the treatment of diesel exhaust and therefore the proposed modification would destroy the intended purpose of the Rummller device. Dillman is not a known configuration for the separation of liquid and solid waste.

Even if there was some motivation to modify Rummller in view of the teachings of Dillman, such would not result in Applicant's claimed invention which recites "exhaust first flows through the catalyzed foam filter and then flows through the wall-flow filter." Again, Rummller's system is for the separation of liquid and solid waste, and when the solid waste is irradiated by microwave energy, the combustion therefrom moves in all directions through the

filter and does not flow first through the catalyzed foam filter and then through the wall-flow filter as recited in Applicant's independent claims.

#### **Section (4)**

Claims 31-32, 34 and 38 depend from independent claim 30 and are patentable at least for the same reasons claim 30 is patentable. Claim 46 depends from claim 30 and is patentable at least for the same reasons.

#### **Section (5)**

Claims 22, 27, 30, 36, 37, 39, 40, 43 and 44 were rejected under 35 U.S.C. 103(a) as being unpatentable over Paas (US 5431706) in view of Rummller et al. (U.S. 5853579) and Dillman (US 5873918) and Ernst (US 3290876).

Claims 30-36 depend from independent claim 22; claim 39 depends from independent claim 30; claim 42 depends from independent claim 40; and claim 44 depends from independent claim 43. Each of the independent claims 22, 30, 40 and 43 were rejected above under 35 U.S.C. 103 over Paas, in view of Rummller and Dillman. Dependent claims 36, 37, 39, 42 and 44 are patentable over Paas, Rummller and Dillman at least for the reasons stated above. The addition of Ernst '876 does not overcome the deficiencies of Paas, Rummller and Dillman. Withdrawal of the objection is respectfully requested.

#### **Section (6)**

Claims 22, 36, 37, 40 and 42 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rummller et al. (U.S. 5853579) in view of Dillman (US 5873918) and Ernst (US 3290876).

Again, claims 36-37 dependent from independent claim 22; and claim 42 depends from independent claim 40. Applicant maintains that dependent claims 36, 37 and 42 are patentable over Rummller in view of Dillman at least for the reasons set forth in Section 2 above. The

addition of Ernst doesn't overcome the deficiencies of Rummler and Dillman. No prima facie case of obviousness has been established. Withdrawal of the objection is respectfully requested.

#### Section (7)

Claims 30, 39, 43 and 44 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rummler et al. (U.S. 5853579) in view of Dillman (US 5873918) and Ernst (US 3290876) and either one of Miller et al. (3319793), Nagaoka (6488842) or Paas (US 5431706).

Claim 39 depends from independent claim 30 and claim 44 depends from independent claim 43. Applicant maintains that claims 39 and 40 are patentable over Rummler, Dillman, Miller, Nagaoka or Paas at least for the reasons set forth in Section (3) above. The addition of Ernst doesn't overcome the deficiencies of Rummler, Dillman, Miller, Nagaoka or Paas set forth above. Furthermore, a person of ordinary skill in the art would not be motivated to modify Rummler which teaches a filter system for the separation of liquid and solid waste material and connect the same to a combustion engine as taught in Ernst. Such systems are completely different and no equivalence has been established between the liquid/solid waste filter system of Rummler and an engine combustion exhaust system taught in Ernst. Furthermore, the Examiner's rationale provided for combining references is in error. The Examiner maintains that it would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to provide a separator that has an opening through the separator for the purpose of flowing exhaust gasses through the cores filter and wall filter of Rummler. Again, Rummler does not flow exhaust into the filter system but flows liquid/solid waste therethrough. There would be no need to provide the separator as posed by the Examiner. The Examiner's attention is respectfully directed to Figure 23a and 23b of Rummler which teaches that the location of the ceramic foam catalyst filter 516 should be downstream of what the Examiner proposes to be the wall-flow filter either 522 or 520. Liquid and solid waste flow in through the separator 500 and into the fire tube 502 where solids are retained and separated from liquids

which flow through the system to the sump 504. The solids are trapped on the cellular grate substrate 512 and are irradiated by the microwave source 524. Combustion exhaust from the irradiation then flows through the catalyzed foam filter 516 and out exhaust ports 506 and 508. The catalyzed foam filter is utilized to clean constituents in the exhaust not to produce more nitric oxide to oxidize particulates trapped by the wall-flow filter as recited in Applicant's claimed inventions. The proposed modification and rearrangement of the catalyst foam filter 516 in Rummller would destroy the intended purpose and function of the Rummller device and therefore is improper. No *prima facie* case of obviousness can be established by the proposed modification and the references suggested by the Examiner.

In view of the above Amendments and Remarks, Applicant respectfully requests reconsideration and allowance of the claims now in the case.

The Applicants' counsel authorizes the Commissioner to charge Applicants' deposit account No. 07-0960 for any required fees or deficiencies associated with the filing of this response, or to credit the same deposit account with any overpayments.

Respectfully submitted,  
REISING, ETHINGTON, P.C.



Cary W. Brooks  
Registration No. 33,361  
P. O. Box 4390  
Troy, MI 48099-4390  
(248) 689-3500

CWB

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